

### **REMARKS**

The Amendment, filed in response to the Office Action mailed January 27, 2010, is believed to fully address all and every issue raised in the Office Action. Favorable reconsideration on the merits and allowance of the application are respectfully requested.

#### ***Dispositions of Claims***

Claims 1-6 and 8-16 are all the claims pending in the application.

In the instant Amendment, claim 1 is amended in order more clearly set forth the feature of the claimed subject matter. Amended claim 1 is supported by the disclosure, for example, at page 4, lines 20- page 5, line 13 of the specification, as well as Figures 3-5, and pages 13-14, Reaction Scheme 3.

No new matter is introduced.

#### ***Withdrawn Rejection***

Applicants thank the Examiner for withdrawing the previous rejection of claims under 35 U.S.C. § 102(b) over Han.

#### ***Response to Rejections under 35 U.S.C. § 103 - Claims 1-6 and 8-16 are patentable***

##### **1. Summary of Rejections**

In the Office Action, claims 1-6 and 9-11 are rejected under 35 U.S.C. 103(a) as being assertedly unpatentable over Han (cited in previous Office Action) in view of Huang (cited in previous Office Action).

Claims 8 and 12-14 are rejected under 35 U.S.C. 103(a) as assertedly being unpatentable over Han in view of Huang as applied to claims 1-6 and 9-11 above, and further in view of Bae et al. (cited in previous Office Action).

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as assertedly being unpatentable over Han in view of Huang as applied to Claims 1-6 and 9-11 above, further in view of Shah (cited in previous Office Action).

As all of the references were cited in the previous office action, the discussion of their teachings are not repeated herein for the purpose of brevity.

2. Applicants' Arguments

a. *Claim 1 has been amended*

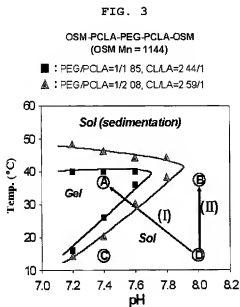
In response, without conceding the rejections, solely for the interests of Applicants to advance the prosecution, Applicants amend claim 1 to cancel "amine group" and to add "at the hydrophilic functional group; and wherein the block copolymer forms hydrogel by sol-gel transition in accordance with a change in temperature and pH" after "by a direct bond."

b. *Claimed block copolymer has different properties and behaves differently from block polymers taught by Han or Huang; and claimed block copolymer shows unexpected effects as shown in Figures of the instant application*

Furthermore, Applicants respectfully submit that the unexpected effects of the claimed block polymer, i.e., "hydrogel formation by sol-gel transition according to the a change in temperature and pH" by the claimed block polymer were shown in Figures 3, 7, 8, 9 and 10 as filed. As clearly seen from Figures 3, 7, 8, 9 and 10 of the instant application, the claimed block polymers are in gel at pH 7.4, and transform into sol around pH 8.0. On the contrary, the block

polymer taught by Han shows transition between micelle (pH 7.0 and 6.8) and demicelle (at pH 7.4) as shown in Fig. 8 of Han.

In order to show the crystal clear differences, FIG. 3 of the instant application and Fig. 8 of Han are reproduced below side by side:



(Fig. 3 of instant application)

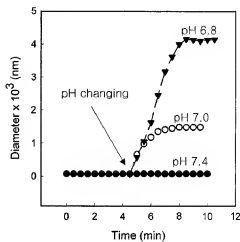
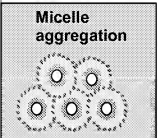
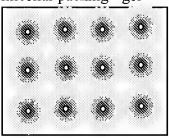
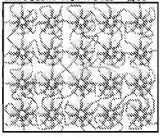
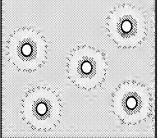
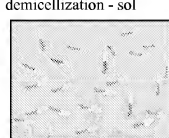
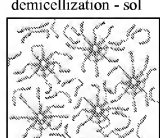


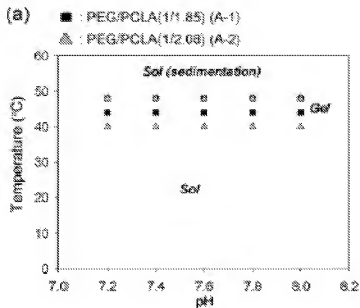
Fig. 8. Time-dependence of mean diameter against pH change of PLLA/PEG-PSD (1 g l<sup>-1</sup>).

(Han, at page 58)

Behavior of the claimed block polymers and Han block polymer in water at low pH (e.g., lower than pH 7.0) and high pH (e.g., around pH 8.0) may be depicted as follows:

	Han's block polymer	Claimed block polymer	
Low pH	 <p><b>Micelle aggregation</b></p>	 <p>micellar packing - gel</p>	 <p>micellar network - gel</p>
High pH		 <p>demicellization - sol</p>	 <p>demicellization - sol</p>

In addition, the block polymer taught by Huang shows *no transition between sol and gel* when there are changes in the temperature and pH. The following is taken from an article (Shim et al., Biomacromolecules 2006, 7, 1935-41), which was published after the instant application. A copy of Shim publication is submitted under a separate cover. In this regard, Applicants respectfully submit that no IDS is required because the Shim publication is submitted in support of Applicant's arguments made in response to the office action. MPEP 609.



Source: Shim et al., Biomacromolecules 2006, 7, 1935-41, Figure 5.

Thus, the polymers taught by Han and Huang have different properties from each other (and from the claimed block polymers), and they behave differently from each other (and from the claimed block polymers). These are evident from Han's own teaching (Fig. 5 of Han) and Shim publication which shows the behavior and properties of the polymer of Huang.

Therefore, one skilled in the art would not have been motivated to combine the teachings of Han and Huang. In addition, in Huang, PEG is located in the middle of the block copolymer, rather than at the end of the copolymer, one skilled in the art would see difficulties to directly couple PSD of Han to PEG of the pentapolymer of Huang. Furthermore, one skilled in the art clearly sees it would be very difficult to control and adjust the ratios between each components of Han and Huang in order to combine their teachings and couple the polymers.

Even if assuming that the teachings of Han and Huang are combined and one skilled in the art attempt to produce a copolymer from the block polymer of Han and block polymer of Huang, the resulting copolymer is predicted to show properties different from those of claimed

block polymer and behave differently from the claimed block copolymer as follows: (i) the resulting copolymer will show micelle - demicelle transition (rather than sol-gel transition); and (ii) the resulting copolymer will not reversely transform to sol, even if the copolymer happens to form a hydrogel.

For these reasons, Applicants respectfully submit that the claimed block copolymer is patentable over Han and Huang, either alone or in combinations.

None of other cited references, i.e., Bac or Shah cures the deficiencies of the teachings of Han and Huang, or provides guidance to modify the combined teachings of Han and Huang to reach the claimed invention with reasonable expectation of success.

Accordingly, Applicants respectfully request the rejection be withdrawn.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number **202-775-7588**.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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**23373**

CUSTOMER NUMBER

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